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EXAMINER	
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2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/567,015	ARIMOTO ET AL.	
	Examiner	Art Unit	
	LILIANA CERULLO	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 10 March 2009.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 14-26 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 14-26 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

In an amendment dated, 3/10/2009, the Applicant amended claims 14-26. Currently claims 14-26 are pending.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. **Claim 26** are rejected under 35 U.S.C. 102(b) as being anticipated by Greier et al. in US 2002/0149598 (hereinafter Greier).

Greier teaches a driving method for a matrix-type display apparatus which drives a display panel including a plurality of pixels disposed in matrix form and displays an image (para. 16, AMLCDs), comprising:

a converting step of gamma converting an input video signal (para. 95-96 Eq. 4 which takes place as part of the fifth step in Fig. 22. Para. 63 teaches a color signal as input video signal), using n pairs of gamma characteristics (para. 95 where the gamma characteristic of Eq. 4 includes a pair of gamma characteristics, one for dark pixels and the other for bright pixels, and para. 63 and 99-100 where there could be 255 levels for an 8 bit color, thus teaching 255 different pairs of gamma characteristics, one for each gradation level) which are made up of first and second gamma characteristics different from each other (para. 95, 98 and 101, there are two pairs of gamma characteristics in Eq. 4: the first portion with n_d refers to the dark pixels and the second portion with n_b refer to the bright pixels); and

a selecting step of specifying a transmittance to be used for display based on the input video signal (DAC of para. 66 which maps the pixel data to a color space, paras.

72-73 where the gray [DAC] level is matched to luminance. Thus teaching the DAC selecting a gray level and luminance based on the pixel data), selecting one pair of gamma characteristics (n_d and n_b of Eq. 4 of para. 95) from among the n pairs of gamma characteristics (n_d and n_b of Eq. 4 of para. 95 for each target level of para. 100) according to the specified transmittance to be used for display (target level of para. 99-100), and selecting an output (actual n_d and n_b of para. 96) supplied to the display panel from among the 2n outputs (where n is 255 for 8 bit color per para. 63, and output gradation n_d and n_b have a gradation level for each input gradation level para. 100) which are gamma corrected in the converting step (Eq. 4 of para. 95), so that a ratio between a first distribution area of pixels (dark pixels of para. 96) driven by the video signal gamma corrected by use of the first gamma characteristic (portion of Eq. 4 that includes n_d) of the selected pairs of gamma characteristics (n_b and n_d for a specified input target gradation level of para. 99) and a second distribution area of pixels (bright pixels of para. 96) driven by the video signal gamma corrected by use of the second gamma characteristic (portion of Eq. 4 that includes n_b) of the selected pairs of gamma characteristics (n_b and n_d for a specified input target gradation level of para. 99) is equal to a distribution area ratio specified in advance for the selected pairs of gamma characteristics (para. 95, where the halftone luminance specified in advanced of Eq. 4 used above, has a ratio of ½:½).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. **Claims 14-16 and 23-25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. in US 2002/0149598.

4. Regarding **claims 14 and 25**, Greier teaches a matrix-type display apparatus which drives a display panel including a plurality of pixels disposed in matrix form and displays an image (para. 16, AMLCDs), comprising:

a converting portion adapted to gamma-convert (para. 92, algorithm LUT which stores the gamma formula in Eq. 4 of para. 95) an input video signal (color signal of para. 63), using pairs of gamma characteristics (para. 95 where the gamma characteristic of Eq. 4 includes a pair of gamma characteristics), each made up of first and second gamma characteristics different from each other (para. 95, 98 and 101, there are two pairs of gamma characteristics in Eq. 4: the first portion with n_d refers to the dark pixels and the second portion with n_b refer to the bright pixels); and

a selecting portion adapted to specify a transmittance to be used for display based on the input video signal (DAC of para. 66 which maps the pixel data to a color space, paras. 72-73 where the gray [DAC] level is matched to luminance. Thus teaching the DAC selecting a gray level and luminance based on the pixel data), to select one pair of gamma characteristics (n_d and n_b of Eq. 4 of para. 95) from among the

pairs of gamma characteristics (n_d and n_b of Eq. 4 of para. 95) according to the specified transmittance to be used for display (target level of para. 99-100) and to select an output (actual n_d and n_b of para. 96) supplied to the display panel from among the outputs (output gradation n_d and n_b) which are gamma corrected by said converting portion (Eq. 4 of para. 95), so that a ratio between a first distribution area of pixels (dark pixels of para. 96) driven by the video signal gamma corrected by use of the first gamma characteristic (portion of Eq. 4 that includes n_d) of the selected pairs of gamma characteristics (n_b and n_d for a specified input target gradation level of para. 99) and a second distribution area of pixels (bright pixels of para. 96) driven by the video signal gamma corrected by use of the second gamma characteristic (portion of Eq. 4 that includes n_b) of the selected pairs of gamma characteristics (n_b and n_d for a specified input target gradation level of para. 99) is equal to a distribution area ratio specified in advance for the selected pairs of gamma characteristics (para. 95, where the halftone luminance specified in advanced of Eq. 4 used above, has a ratio of ½:½).

Although Greier does not explicitly teach using a different gamma curve for each color, Greier does teach using three color pixels (para. 63) and that there is color variation with each pixel [gradation] level (para. 81). Furthermore, Greier also teaches error correction of strong color shifts near 50% maximum luminance (para. 102). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention, to calculate three different gamma characteristic values, one for each color RGB, in order to obtain the benefit of compensating for color shifts in grey levels. By doing so, there would be 3 pairs of gamma curves (n=3), one for each color.

5. Regarding **claim 15**, Greier teaches a block comprising n+1 pixels (Fig. 18 where a block is a 2x2 subpixel) and the said selecting portion selects an output supplied to the display panel from among the 2n outputs (dark and bright for each RGB) which are gamma corrected by said the converting portion, so that the ratio between the first distribution area (dark shown hatched in Fig. 18) and the second distribution area (bright shown blank in Fig. 18) is equal to the distribution area ratio in the block (as shown, where the ratio would be 2/4 bright : 2/4 dark).

6. Regarding **claim 16**, Greier teaches wherein the ratio of the first distribution area per block with the area of the pixels per block (2 pixels per block of 4 pixels per Fig. 18, thus the ratio is 1/2) and the ratio of the second distribution area per block with the area of the pixels per block (2 pixels per block of 4 pixels per Fig. 18, thus the ratio is 1/2) for each pair of gamma characteristics (dark and bright shown as hatched and blank in Fig. 18) are selected out of k/(n+1) and (n+1-k)/(n+1), if where k is an integer of one to n (recall that n=3 for RGB. If k=2, then k/(n+1)=2/4=1/2 and (n+1-k)/(n+1)=2/4=1/2).

7. Regarding **claim 23**, Greier teaches wherein said selecting portion selects an output supplied to the display panel from among the 2n outputs which are gamma corrected by said converting portion (as explained for claim 14, it would have been obvious to have a pair of gamma characteristics for each color RGB), in a pixel made up of a red pixel, a green pixel and a blue pixel (para. 63 and Figs. 15-20).

8. Regarding **claim 24**, Greier teaches wherein said selecting portion selects an output supplied to the display panel from among the 2n outputs which are gamma corrected by said converting portion (as explained for claim 14, it would have been obvious to have a pair of gamma characteristics for each color RGB), for each of a red pixel, a green pixel and a blue pixel comprised by one pixel (para. 63 and Fig.s 15-20).

9. **Claims 17-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Greier et al. in US 2002/0149598 in view of Yamashita et al. in US 2001/0026258 (hereinafter Yamashita).

10. Regarding **claim 17**, Although Greier teaches that the pixel patterns can have proportional darkened and brightened areas (Greier para. 116) and that the halftone method can be implemented in a 2x2 sub-pixel pattern (Greier, Fig. 19, where every 2 sub-pixels a sub-pixel is bright or dark, thus each sub-pixel can be controlled independently), Greier fails to teach a block of one pixel where a first sub-pixel has an area Sa and the second sub-pixels has an area mSa where m>1. However, Yamashita teaches a display wherein a block comprises one pixel (Yamashita, Fig. 1 and para. 41):

each pixel of the display panel is made up of, as one pixel (Yamashita, Fig. 1), a first sub-pixel (Yamashita, Fig. 1, sub-pixel B) which has a first pixel area Sa (as shown) and a second sub-pixel (Yamashita, Fig. 1, sub-pixel A) which has a second pixel area Sb (Yamashita, Fig. 1, sub-pixel A has an area S, which is 4 times greater than the area

of sub-pixel B, thus m=4) and that the luminance of each sub-pixel is proportional to the area (Yamashita, para. 42).

Thus, it would have been obvious to one of ordinary sill in the art at the time of the invention to use Yamashita's division of pixels in Greier's display in order to obtain the benefit of increased high gray scale display in a color LCD (as taught by Yamashita in para. 67), and because Yamashita's division of pixel would accommodate patterns which have proportional dark and bright pixels, such as 75% (Greier, para. 117). By doing such combination, the selecting portion selects an output supplied to the display panel from among the 2n outputs which are gamma corrected by said converting portion (dark and bright gamma characteristic for each color RGB as explained for claim 14), so that the ratio of the first distribution area (Yamashita, Fig. 1, sub-pixel B) and the second distribution area (Yamashita, Fig. 1, sub-pixel A) is equal to the distribution area ratio in the block (Yamashita 4/4:1/4 which would correspond to a target level in Greier's para. 117 of between 75% and 100%).

11. Regarding **claim 18**, Greier in view of Yamashita teach the ratio of the first distribution area with the area of the pixel (Yamashita, Fig. 1, the total area of the pixel is 5/4, thus the ratio of the sub-pixel B is 1/5) and the ratio of the second distribution area with the area of the pixel (Yamashita, Fig. 1, the total area of the pixel is 5/4, thus the ratio of the sub-pixel B is 4/5) for each pair of gamma characteristics selected out of 1/(m+1) and m/(m+1) (as explained for claim 17, m=4).

12. Regarding **claim 19**, Greier in view of Yamashita teach wherein the second pixel area Sb=4Sa (Yamashita Fig. 1, sub-pixel A with area S and sub-pixel B with area S/4) and that the transmittances are different by varying the pixel area (Yamashita para. 61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the technology available at hand and set the area of Yamashita's sub-pixel A to meet the relation of $1.5Sa \leq Sb \leq 3Sa$, as it was already Yamashita's intention to vary the transmittance and luminance of the sub-pixels by altering their area (Yamashita para. 61).

13. Regarding **claim 20**, Although Greier teaches that the pixel patterns can have proportional darkened and brightened areas (Greier para. 116) and that the halftone method can be implemented in a 2x2 full pixel pattern (Greier, Fig. 15, where every pixel is bright or dark, specially not that in each column, the same color sub-pixels alternate between bright and dark), Greier fails to teach a block of one pixel where a first sub-pixel has an area Sa and the second sub-pixels has an area mSa where m>1. However, Yamashita teaches a display wherein a block comprises three sub-pixels pixel (Yamashita, Fig. 4, para. 41 and 64):

each pixel of the display panel is made up of, as one pixel (Yamashita, Fig. 4), a first sub-pixel (Yamashita, Fig. 4, sub-pixel R) which has a first pixel area Sa (Yamashita, Fig. 4, area 64 of sub-pixel R) and a second sub-pixel (Yamashita, Fig. 4, sub-pixel G) which has a second pixel area Sb (Yamashita, Fig. 4, area 65 of sub-pixel G, where sub-pixel R area 4 has an area S, which is 4 times greater than the area of

sub-pixel G area 65, thus m=4) and that the luminance of each sub-pixel is proportional to the area (Yamashita, para. 42).

Thus, it would have been obvious to one of ordinary sill in the art at the time of the invention to use Yamashita's division of pixels in Greier's display in order to obtain the benefit of increased high gray scale display in a color LCD (as taught by Yamashita in para. 67), and because Yamashita's division of pixel would accommodate patterns which have proportional dark and bright pixels, such as 75% (Greier, para. 117). By doing such combination, in Greier's 2x2 full pixel method (Greier, Fig. 15), a block comprises two pixels (one black and one dark as shown in Greier's Fig. 15) the selecting portion selects an output supplied to the display panel from among the 2n outputs which are gamma corrected by said converting portion (dark and bright gamma characteristic for each color RGB as explained for claim 14), so that the ratio of the first distribution area (Yamashita, Fig. 4, area 64 of sub-pixel R, which would correspond to Greier's first row of Fig. 15 and therefore the R sub-pixel would be dark) and the second distribution area (Yamashita, Fig. 4, area 65 of sub-pixel G which would correspond to Greier's second row of Fig. 15 and therefore the G sub-pixel would be bright) is equal to the distribution area ratio in the block (Yamashita 4/4:1/4 which would correspond to a target level in Greier's para. 117 of between 75% and 100%).

14. Regarding **claim 21**, Greier in view of Yamashita teach wherein the ratio of the first distribution area with the area of the block (Yamashita, Fig. 1, the total area of the block is 3.75, thus the ratio of sub-pixel R area 64 is 0.26) and the ratio of the second

distribution area with the area of the block (Yamashita, Fig. 1, the total area of the block is 3.75, thus the ratio of sub-pixel G area 65 is 0.06) for each pair of gamma characteristics is (Note that m=4, thus 2+2m=10, 2/10=0.2 and 1/10=0.1. Thus the ratio of sub-pixel R area 64 is equivalent to 2/10 and the ratio of sub-pixel G area 65 is equivalent to 1/10).

15. Regarding **claim 22**, Greier in view of Yamashita teach wherein the second pixel area Sb=4Sa (Yamashita Fig. 1, sub-pixel R area 64 with area S and sub-pixel G area 65 with area S/4) and that the transmittances are different by varying the pixel area (Yamashita para. 61). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the technology available at hand and set the area of Yamashita's sub-pixel R area 64 to meet the relation of $1.5Sa \leq Sb \leq 3Sa$, as it was already Yamashita's intention to vary the transmittance and luminance of the sub-pixels by altering their area (Yamashita para. 61).

Response to Arguments

16. Applicant's arguments with respect to claims 14 and 26 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sawabe (US 7,466,298) teaches a method for adjusting the luminance ratio based on the input video signal and where the pixels have divisional pixels of different areas.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LILIANA CERULLO whose telephone number is (571)270-5882. The examiner can normally be reached on Monday to Thursday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on 571-272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/L. C./
Examiner, Art Unit 2629

/Amr Awad/
Supervisory Patent Examiner, Art Unit 2629